Section 14
Capital Improvement Program

This section presents a 20-year capital improvement program for the best performing alternative in the evaluation process (Alternative F-E). The maps attached to the master plan present the proposed water and wastewater infrastructure for this alternative. The capital investment program presents an estimate of the necessary annual expenses within the planning period for each one of the recommended projects, as well as a summary of necessary capital expenses every five-year period. This section presents a prioritization of the recommendations, as well as the identification and description of some potential funding sources.

It is suggested that CESPT initiate contact with possible funding sources, in order to efficiently determine which projects are subject to funding within each one of the different credit programs and grants. It is imperative to fins compatibility between the priorities of CESPT and the funding institutions, with the intent to maximize the attainment of grants.

Finally, in phases after the master plan, it is recommended that CESPT develop a detailed financial analysis for the implementation of each project, which will analyze its financial feasibility, the instrumentation impacts of rates and the cash flow of the operating agency. A detailed study of the rate structure of CESPT is also needed, in which the current rates for each type of consumer and consumption range are reviewed. The accountability of a rate structure that reflects real costs for operation, maintenance and investments amortization will be of crucial importance to the financial sustainability of the operating agency.

14.1 Capital Improvement Program for 5, 10 and 20 Years

Section 12 presents cost estimates for the construction and operation and maintenance for each of the twelve alternatives developed as part of this master plan. The costs for the highest overall scoring alternative evaluated (Alternative F-E) are summarized in Table 14-1. This section presents a capital improvements program based on Alternative F-E, as this alternative best meets the master plan objectives, as described in Section 12.

Table 14-1
Summary of Cost Estimates for the Best-Performing Alternative

Project	Capital Cost (US$)	Annual Operation and Maintenance Cost (US$)	Total Annualized Cost (US$)
Wastewater			
Existing WWTPs			
Rehabilitation of Rosarito I	1,192,000	201,000	307,000
Proposed WWTPs			
Alamar Regional	19,475,000	2,463,000	4,155,000
La Morita Expansion	10,260,000	1,296,000	2,208,000
Rosarito I Expansion	2,362,000	269,000	513,000
Popotla	3,490,000	421,000	761,000
Mesa del Descanso	1,422,000	135,000	300,000
Puerto Nuevo	1,422,000	135,000	300,000
La Misión	1,234,000	105,000	254,000
Proposed WWTP's Subtotal	**39,664,000**	**4,824,000**	**8,489,000**
Wastewater Transmission Mains	23,551,000	2,112,000	5,265,000
Effluent Transmission Mains	34,787,000	696,000	5,353,000
Primary Sewer Lines	50,601,000	1,012,000	7,786,000
Secondary Sewer Lines to Cover 100% of the Current Service Area	41,680,000	834,000	6,414,000
Secondary Sewer Network to Cover Future Growth	71,711,000	1,434,000	11,035,000
Rehabilitation of Secondary Sewer Lines	22,063,000	441,000	3,395,000
Potable Water			
Existing Infrastructure			
Rehabilitation of the El Florido WTP	3,125,000	771,000	1,189,000
Rehabilitation of the A. Rodríguez WTP	519,000	964,000	1,033,000
Existing Infrastructure Subtotal	**3,644,000**	**1,734,000**	**2,222,000**
Proposed Production Infrastructure			
Desalination			
Desalination Plant	196,591,000	16,990,000	43,309,000
Indirect Potable Reuse			
Microfiltration/Reverse Osmosis – Alamar WWTP	45,311,000	3,917,000	9,984,000
Microfiltration/Reverse Osmosis - La Morita and Monte de los Olivos WWTP	68,005,000	2,077,000	11,181,000
New Rodríguez WTP Plant for reuse water	23,370,000	1,106,000	4,235,000
Proposed Production Infrastructure Subtotal	**335,693,000**	**24,138,000**	**69,080,000**
Water Transmission Mains	51,525,000	6,361,000	13,259,000
Distribution System			
Storage Tanks	15,562,000	311,000	2,395,000
Primary Potable Water Lines	26,171,000	523,000	4,027,000
Pumping Stations	43,437,000	13,732,000	19,547,000
Distribution Lines to Cover 100% of the Current Service Area	4,819,000	96,000	742,000
Distribution Lines to Cover Future Growth	55,787,000	1,116,000	8,584,000
Rehabilitation of Lines	11,131,000	223,000	1,713,000
Distribution System Subtotal	**156,907,000**	**16,001,000**	**37,008,000**

Table 14-1
Summary of Cost Estimates for the Best-Performing Alternative

Project	Capital Cost (US$)	Annual Operation and Maintenance Cost (US$)	Total Annualized Cost (US$)
Subtotal	**830,603,000**	**59,740,000**	**170,941,000**
Contingencies (%)	20%		
Contingencies	207,651,000		
Subtotal	**1,038,254,000**		
Administration and Engineering (%)	20%		
Administration and Engineering	207,651,000		
Total	**1,245,905,000**	**59,740,000**	**226,541,000**

Capital costs were estimated based on the final design capacity of each project. However, the construction of some projects, such as the wastewater treatment plants and the desalination plant, will be implemented in phases corresponding to the increase in water demand, until reaching the final capacity. On the other hand, pipeline projects such as wastewater collection and transmission mains, potable water transmission and distribution mains, and effluent transmission mains will be built in a single phase, since partial construction in phases will result more costly and less practical.

Table 14-2 presents the cost estimates for the capital costs required for five-year periods. Note that the expenditure should be apportioned several years before the date of planned operation. For example, it is assumed that the construction of the first phase of the Alamar Regional wastewater treatment plant and the desalination plant will require three years. However, some projects will be constructed within a one-year period, such as the smaller scale pumping stations and transmission mains. Table 14-2 shows the costs broken down into five-year periods for the 20-year planning period, while Table 14-3 shows all years of the planning period, as well as the year in which each facility is estimated to begin operating.

Table 14-2
Investment Timetable for Alternative F-E by Five Year Periods (in Thousands of Dollars)

Project	Investment Cost (with Contingencies and Administrative and Engineering Costs)	2003-2008	2009-2013	2014-2023
Wastewater				
Existing WWTPs				
Rosarito I	2,000	2,000	0	0
Proposed WWTPs				
Alamar Regional	29,000	18,000	12,000	0
La Morita Expansion	15,000	0	15,000	0
Rosarito I Expansion	4,000	4,000	0	0
Popotla	5,000	3,000	2,000	0
Mesa del Descanso	2,000	2,000	0	0
Puerto Nuevo	2,000	2,000	0	0

Table 14-2
Investment Timetable for Alternative F-E by Five Year Periods (in Thousands of Dollars)

Project	Investment Cost (with Contingencies and Administrative and Engineering Costs)	2003-2008	2009-2013	2014-2023
La Misión	2,000	2,000	0	0
Proposed WWTPs Subtotal	**59,000**	**30,000**	**29,000**	**0**
Wastewater Transmission Mains	35,000	30,000	5,000	0
Effluent Transmission Mains	52,000	52,000	0	0
Primary Sewer Lines	76,000	38,000	38,000	0
Secondary Sewer Lines to Cover 100% of the Current Service Area	63,000	34,000	15,000	13,000
Secondary Sewer Lines to Cover Future Growth	108,000	52,000	30,000	25,000
Rehabilitation of Secondary Sewer Lines	33,000	17,000	16,000	0
Potable Water				
Existing Infrastructure				
Rehabilitation of the El Florido WTP	5,000	5,000	0	0
Rehabilitation of the A.L. Rodríguez WTP	1,000	1,000	0	0
Existing Infrastructure Subtotal	***6,000***	***6,000***	***0***	***0***
Proposed Production Infrastructure				
Desalination				
Desalination Plant	295,000	206,000	88,000	0
Indirect Potable Reuse				
Microfiltration/Reverse Osmosis – Alamar WWTP	68,000	0	0	68,000
Microfiltration/Reverse Osmosis - La Morita and Monte de los Olivos WWTP	102,000	0	0	102,000
New Rodríguez WTP for reuse water	35,000	0	0	35,000
Proposed Production Infrastructure Subtotal	**504,000**	**210,000**	**88,000**	**205,000**
Water Transmission Mains	77,000	0	0	77,000
Distribution System				
Storage Tanks	23,000	15,000	5,000	3,000
Primary Water Lines	39,000	23,000	7,000	9,000
Pumping Stations	65,000	47,000	0	18,000
Distribution Lines Cover 100% of the Current Service Area	7,000	7,000	0	0
Distribution Lines to Cover Future Growth.	84,000	42,000	24,000	18,000
Rehabilitation of Lines	17,000	9,000	8,000	0
Distribution System Subtotal	**235,000**	**144,000**	**43,000**	**49,000**
Total (in thousands of dollars)	**1,246,000**	**611,000**	**266,000**	**369,000**

Table 14-3
Capital Improvement Program

Infrastructure	Operational	Capital Costs with Contingencies and Engineering Costs (Thousands of Dlls)	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Existing WWTPs		**1,787**	**0**	**0**	**1,787**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Rosarito I*	2005	1,787	0	0	1,787	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
La Morita	2005	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Proposed WWTPs		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Regional Alamar	2008 and 2013	29,212	0	0	2,629	5,258	9,640	0	0	0	6,427	5,258	0	0	0	0	0	0	0	0	0	0	0
La Morita Expansion	2014	15,390	0	0	0	0	0	0	0	0	0	8,465	6,926	0	0	0	0	0	0	0	0	0	0
Rosarito I Expansion	2006	3,543	0	0	3,543	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Popotla	2004 and 2013	5,235	3,141	0	0	0	0	0	0	0	0	2,094	0	0	0	0	0	0	0	0	0	0	0
Mesa del Descanso	2005	2,133	0	2,133	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Puerto Nuevo	2004	2,133	2,133	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
La Misión	2005	1,850	0	1,850	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sub-total		**59,496**	**5,274**	**3,983**	**6,172**	**5,258**	**9,640**	**0**	**0**	**0**	**6,427**	**15,817**	**6,926**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Wastewater Transmission Mains		35,327	1,934	1,773	2,284	12,720	11,294	0	0	0	1,807	2,359	1,156	0	0	0	0	0	0	0	0	0	0
Effluent Transmission Mains		52,181	10,410	23,510	47	7,285	10,928	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Primary Sewer Lines	2003, 2004, 2005, 2006, 2011, 2013 and 2014	75,902	3,795	7,590	7,590	11,385	3,795	3,795	3,795	7,590	11,385	7,590	7,590	0	0	0	0	0	0	0	0	0	0
Secondary Sewer Lines to Cover 100% of the Current Service Area	2003-2023	62,520	8,627	7,223	5,933	4,370	3,824	3,824	3,278	3,278	3,278	2,731	2,731	2,185	2,185	2,185	1,639	1,639	1,093	1,093	546	546	313
Secondary Sewer Network to Cover Future Growth	2003-2023	107,567	11,012	9,280	8,639	8,298	7,814	7,448	6,932	6,542	6,157	5,608	5,196	4,615	4,179	3,779	3,193	2,767	2,147	1,694	1,081	647	538
Rehabilitation of Secondary Sewer Lines	2004-2013	33,095	0	1,655	3,309	3,971	4,964	3,309	2,317	4,302	3,309	3,309	2,648	0	0	0	0	0	0	0	0	0	0
Potable Water																							
Existing Infrastructure		**5,466**	**0**	**0**	**2,813**	**2,653**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
El Florido Treatment Plant	2007	4,688	0	0	2,813	1,875	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A. Rodríguez Treatment Plant	2007	778	0	0	0	778	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Proposed Production Infrastructure		503,539	44,776	60,064	75,714	0	0	29,489	44,233	44,233	0	0	0	10,201	25,660	29,165	24,118	37,608	44,295	20,390	13,593	0	0
Desalinization Plant	2006 and 2011	294,887	44,233	58,977	73,722	0	0	29,489	44,233	44,233	0	0	0	0									
Indirect Potable Reuse																							
Microfiltration/Reverse Osmosis – Alamar WWTP	2022	67,967	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10,195	23,788	20,390	13,593	0	0
Microfiltration/Reverse Osmosis - La Morita and Monte de los Olivos WWTP	2018 and 2020	102,008	0	0	0	0	0	0	0	0	0	0	0	10,201	20,402	20,402	13,601	20,402	17,001	0	0	0	0
New Rodríguez Treatment Plant – Additional flows	2018 and 2020	35,055	0	0	0	0	0	0	0	0	0	0	0	0	5,258	8,764	10,516	7,011	3,505	0	0	0	0
Proposed infrastructure from capturing conveyance lines to plants		77,288	0	0	0	0	0	0	0	0	0	0	0	0	2,138	18,722	19,806	0	4,491	16,357	15,774	0	0
Distribution System		**235,360**	**11,354**	**49,187**	**33,630**	**12,222**	**29,835**	**7,491**	**12,997**	**7,255**	**6,386**	**11,091**	**5,284**	**3,551**	**7,450**	**10,742**	**20,516**	**1,992**	**1,589**	**1,175**	**793**	**401**	**418**
Storage Tanks	2005, 2006, 2008, 2013 and 2018	23,343	0	5,769	2,320	0	7,354	0	0	0	0	4,729	0	0	0	0	3,172	0	0	0	0	0	0
Primary Potable Water Lines	2005, 2006, 2007, 2008, 2010, 2013, 2016, 2017 and 2018	39,256	0	6,655	7,139	272	9,416	0	6,369	0	0	355	0	0	1,118	3,686	4,246	0	0	0	0	0	0
Pumping Stations	2005, 2006, 2007, 2008, 2016, 2017 and 2018	65,155	0	26,998	13,909	2,260	3,798	0	0	0	0	0	0	0	3,189	4,286	10,713	0	0	0	0	0	0
Distribution Lines to Cover 100% of the Current Service Area	2003-2008	7,229	3,047	1,394	1,394	929	465	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Distribution Lines to Cover Future Growth	2003-2023	83,680	8,307	7,536	7,198	6,756	6,298	5,822	5,459	5,085	4,717	4,338	3,949	3,551	3,143	2,769	2,386	1,992	1,589	1,175	793	401	418
Rehabilitation of Lines	2004-2013	16,697	0	835	1,670	2,004	2,505	1,670	1,169	2,171	1,670	1,670	1,336	0	0	0	0	0	0	0	0	0	0
Direct Cost Sub-Total (Thousands of Dlls)		**1,246,000**	**97,000**	**163,000**	**146,000**	**68,000**	**82,000**	**55,000**	**74,000**	**73,000**	**39,000**	**49,000**	**32,000**	**21,000**	**42,000**	**65,000**	**69,000**	**44,000**	**54,000**	**41,000**	**32,000**	**2,000**	**1,000**

Figure 14-1 graphically presents the investment necessary for each year. As illustrated, the average annual investment should be approximately US $60 million, ranging from less than US $1.5 million to US $164 million. Likewise, it is apparent that the greatest annual investments should be made during the first three years of the planning period, when the first phase of construction for several important projects begins, and pipelines and pumping stations for potable water and wastewater will be built in their entirety.

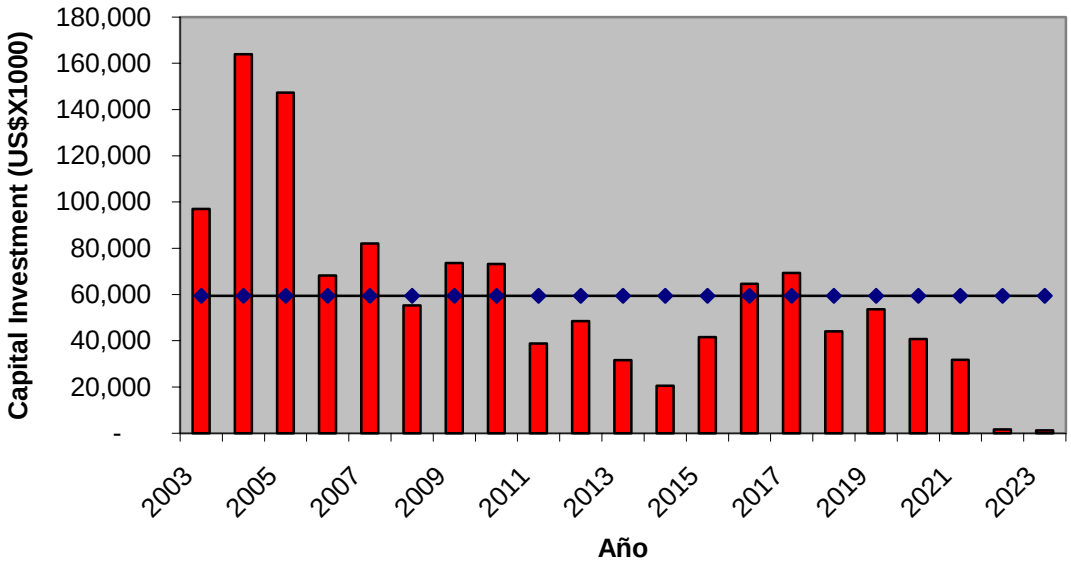

Figure 14-1
Investment Plan (2003-2023)

It is important to point out that the investment program presented in Figure 14-1 is based on the calculated infrastructure required to meet projected demands. However, the execution of the investments may be optimized once a detailed financial analysis is performed.

Figure 14-2 presents the total investment distributed among the different projects types over the course of the planning period. The figure shows that the construction of the desalination plant requires the largest investment, followed by the rehabilitation and expansion of sewer and potable water lines. The next most important area for investment will be the projects for indirect potable reuse, mainly the microfiltration and reverse osmosis plants.

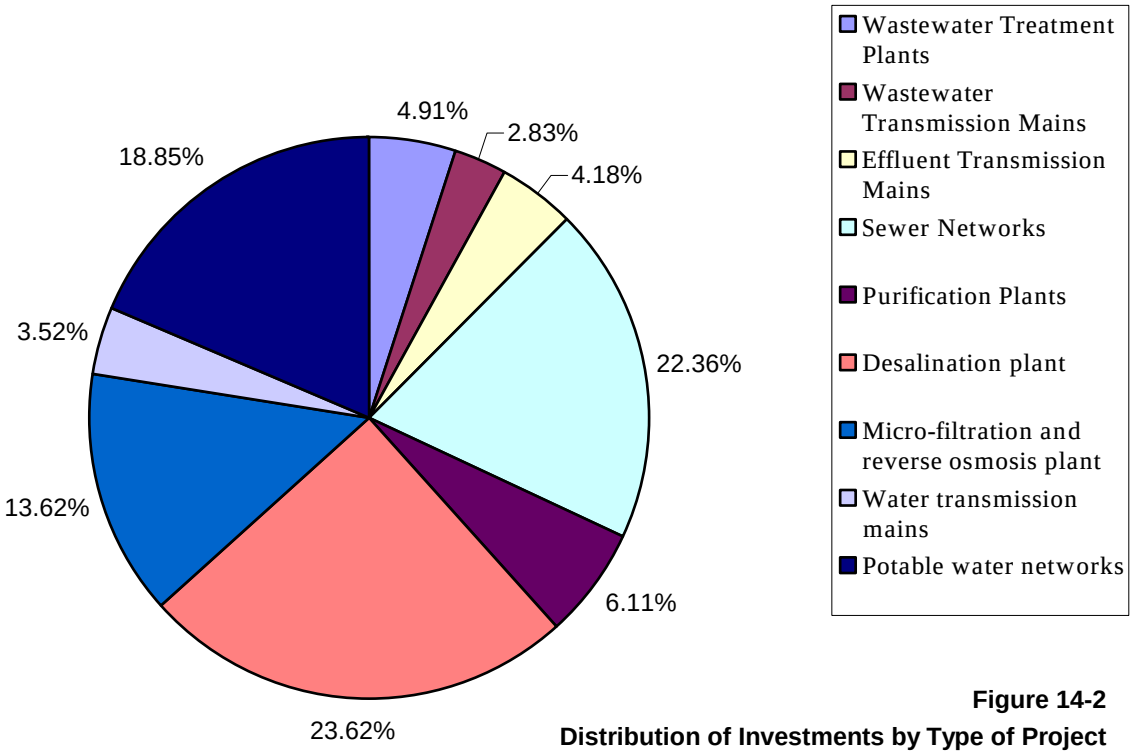

Figure 14-2
Distribution of Investments by Type of Project

14.2 Prioritization of Investments and Activities

Not all of the recommended projects in the investment program are equally important, nor do they need to be constructed at the same time. In this section, the order in which the projects should be executed is recommended. In addition to construction, there are other necessary actions that should be performed for the implementation of the projects or required programs, as described below.

14.2.1 Potable Water

As previously mentioned in Section 6, CESPT currently has a deficit to meet the maximum daily potable water demand, although the necessary infrastructure to satisfy the average daily demand is in place, thanks to the capacity of the water sources (wells and treatment plants) and the elevated tanks in the distribution system. If the recommended water production, transmission and distribution projects are not implemented, the gap between production capacity and maximum daily demand will increase, and a deficit for the average daily demand will also be created as population and commercial and industrial activity grow in the study area.

As the first priority for the potable water system, it is recommended to complement the current planning activities with additional detailed planning activities necessary for the construction of a seawater desalination plant. These planning activities include the development of a facilities plan.

With this goal, it is recommended that CESPT establish communications with potential funding agencies such as the Border Environment Cooperation Commission

(BECC) and the North American Development Bank (NADB). The detailed planning studies should be followed by the design phase. Likewise, the potential for financing through grants low-interest loans for the construction of the desalination plant should be explored.

Additionally, it is recommended that CESPT evaluate the possibility of constructing the desalination plant with private-sector participation, which could include, but not be limited to, a build-operate-transfer (BOT) contract through which a private company would build and operate the plant for a set period of time in exchange for a periodic fee. Additionally, the contract would state that the plant would eventually become property of CESPT. This type of arrangement has two important advantages. First, the high cost of investment would be financed by the contracted party, which would eliminate the need for a significant one-time expenditure by CESPT. Secondly, the contractor would have the technical expertise to design, construct and operate the plant and its sophisticated technology, since there is little experience in Mexico with this technology.

The construction of a desalination plant in conjunction with an electrical power generation plant provides another opportunity for private participation (if the privatization of the production of electric energy takes place). Proposals have been made confirming the interest in the construction of power plants in the coastal area of Tijuana and Playas de Rosarito. The combination of these two plants would lead to energy savings, as well as the shared use of the water intake and discharge infrastructure. The mixture of brine from the desalination plant with waste cooling water from the electric plant will reduce the potential salinity problems caused by the waste brine.

The construction of a desalination plant and its operation and maintenance represent important expenditures for CESPT, whether through direct construction and operation by CESPT, or through private participation. The success of this project will be dependent on its financial feasibility and sustainability. The best position for CESPT would be to obtain considerable grant resources, although this is not likely to occur for 100 percent of the construction costs. CESPT should guarantee sufficient cash flow to pay off the credit obligations and the operation and maintenance costs. To this end, a detailed financial rate study should be performed to determine the modifications needed for the rate structure and the efficiency of the utility.

Furthermore, it is recommended that CESPT initiate detailed studies to evaluate the feasibility of, and requirements for the indirect potable reuse projects. Hydrogeological and geochemical studies should be conducted on the Tijuana-Alamar River Aquifer to determine potential injection and extraction rates to further assess the feasibility of this project. Additionally, the soil characteristics and water quality of the aquifer should be evaluated with respect to the presence of potential contaminants. Since a large part of the aquifer is located within an urban area, there is the possibility of the presence of some level of contamination in the aquifer, which could lessen the feasibility of the project. Lastly, the implementation of a reuse pilot

project, which could include the construction of a small advanced treatment module, is recommended.

Similarly, a study should be performed on the Abelardo L. Rodríguez Reservoir for the indirect potable reuse program. The amount of water that can be discharged and recovered without affecting the reservoir's capacity to control storm water flows, as well as the potential for contamination of the high quality reservoir water with surface runoff.

The establishment of a non-potable reuse program could contribute to the reduction in demand for potable water, although this potential reduction is not included in the projected demands and infrastructure needs. CESPT should conduct a feasibility study for the implementation of this program, including a market study to identify potential water demand and the necessary water quality. The financial feasibility of this program should also be analyzed.

As mentioned in Section 12, Alternative F-E does not include the construction of an aqueduct for the transmission of additional water from the Colorado River. Nevertheless, it is recommended that CESPT continue to consider this project and participate in the preparation of studies for the construction of a binational aqueduct in cooperation with the County of San Diego, California. The additional use of the Colorado River water could become more important if the detailed aquifer and reservoir studies show a low feasibility for the implementation of the indirect potable reuse program.

The demand projections used in this study, shown in Section 6, anticipate an expansion of the potable water distribution system to supply 100 percent of the population in the urban area of the municipalities of Tijuana and Playas de Rosarito (the study area). It is recommended that CESPT continue increasing the level of service with the goal of reducing public health risks caused by an insufficient supply and the consumption of poor quality water.

The implementation of the best-performing alternative would require several institutional strengthening programs due to their high costs and sophisticated level of technology. Although CESPT has been increasing its physical and commercial efficiency during recent years, in part as a result of the certification and financing processes of BECC and NADB, it is widely recommended that CESPT continue pursuing institutional strengthening programs. The percentage of metered accounts should be increased to 100 percent, and the permanent meter calibration program should be strengthened; meters should be repaired and replaced, particularly for high demand users. An efficient metering program will increase CESPT's revenue stream, while at the same time promoting water savings.

Similarly, CESPT should continue and expand the rehabilitation and replacement programs for lines in poor condition, and the elimination of illicit connections with the goal of reducing physical and commercial water losses.

Finally, it is recommended that CESPT strengthen its education and awareness programs on water conservation and the responsible use of the service. Section 6-5 identifies and describes some water conservation measures that CESPT currently applies as well as some recommended additional measures.

14.2.2 Wastewater System

When the different alternatives were developed, it was assumed that the wastewater treatment plants located within the Tijuana River Basin would discharge their effluent to the Pacific Ocean in the United States through the use of the ocean outfall of the South Bay International Wastewater Treatment Plant (SBIWWTP). Although the outfall is shared by the city of San Diego and the IBWC and has sufficient physical capacity to convey the expected flows, it is important that CESPT establish communications with the appropriate agencies in both countries to verify that the use of the outfall will be permitted. The cost estimates previously presented assume no charge to CESPT for the right to use the outfall or for its operation and maintenance. However, it is recommended that this matter also be discussed with the appropriate agencies.

When the four treatment plants to be built with the Japanese credit program begin operation, the treatment demand will be met until approximately 2008. Nevertheless, it is important that CESPT carry out the recommended rehabilitation for the existing treatment plants, particularly the Rosarito Plant. It is assumed that the rehabilitation currently underway at San Antonio de los Buenos Plant will continue and be complete in 2003.

The expansion of the wastewater collection system to areas without service, as well as the rehabilitation of lines in poor condition is critical for adequate collection, transmission and treatment of wastewater. This in turn will reduce potential negative impacts on the environment and risks to public health. CESPT should continue work on the first stage of the *Tijuana Sana* (Healthy Tijuana) rehabilitation program and begin developing its second phase. The implementation of the second phase will require studies and designs, as well as adherence to the certification and funding requirements of BECC and NADBank, if a search for financing from these institutions is expected.

As mentioned in Section 8, Title VII of the U.S. Public Law 106-457 titled *Tijuana River Valley Estuary and Beach Cleanup*, presents potential for the United States government to finance a privately constructed, owned and operated wastewater treatment facility in Tijuana to treat wastewater generated in Mexico. The construction of the Public Law plant could be compatible with the best-performing alternative, as mentioned in Section 12.

Pretreatment Program

In the cities of Tijuana and Playas de Rosarito there is a large concentration of industrial and commercial establishments, some of which discharge wastewater from their production processes into the sewer system, in addition to their sanitary

discharges. This type of discharge has the potential of including toxic, corrosive or explosive substances, which can interfere with the operation and integrity of the wastewater collection, transmission and treatment system.

It is evident that uncontrolled industrial and commercial discharges present risk to the integrity of the sewer and treatment system, to the security of the CESPT workers, and to the environment; therefore, CESPT should develop an adequate program to control discharges, as well as the legal means and the necessary financial resources for its implementation. The components of this program are mentioned in Section 16.

Table 14-4 summarizes the cost estimates associated with the implementation of the discharge control program, including the preparation of the previously mentioned study.

Table 14-4
Cost Estimate for the Implementation of the Discharge Control Program

Item		Capital Cost (US$)	Annual Cost (US$)
Salaries and benefits			114,840
Study preparation, procedures and statutes		250,000	
Chemical Reagents, Materials and offices		213,600	88,200
	Total	**463,600**	**203,040**

14.3 Financing Options

There are various financing options available for the construction of the recommended projects, each with its own requirements and eligibility criteria. A brief description of the most relevant potential financing sources follows.

Border Environment Cooperation Commission (BECC)

The BECC, together with North American Development Bank (NADB), are binational institutions that were created in conjunction with the North American Free Trade Agreement (NAFTA). The mission of BECC is to identify, develop and certify environmental infrastructure projects in the border area between Mexico and the United States. The projects certified by BECC have access to the resources of the NADB.

BECC provides non-refundable resources through its Project Development Program. Historically, these funds have been used for the development of master plans, environmental impact studies, financial evaluations, and designs. It is recommended that CESPT begin the appropriate process to obtain resources for the development of some of the projects previously identified and prioritized.

North American Development Bank (NADB)

The NADB was created and financed by both the Mexican and United States governments and offers resources for the construction of projects certified by the BECC, and for the preparation of studies related to institutional strengthening.

Through its Institutional Strengthening Program, the bank provides non-refundable resources for the preparation of studies. For CESPT in particular, it is likely that these funds can be obtained for the performance of studies regarding rate structures, financial evaluations of projects, and other studies pertaining to institutional strengthening.

Resources for project construction can be in the form of credit, coming from the bank's own resources, or as grants through the Border Environment Infrastructure Fund (BEIF) financed by the U.S. Environmental Protection Agency (EPA).

The BEIF program has various eligibility requirements, for which probably not all of the proposed projects will be eligible. It is recommended that CESPT begin communications with the NADB with the goal of identifying those projects that could potentially be financed by this program.

It is important to point out that grant resources coming from the municipal, state or federal governments must match the grants of the BEIF program. Therefore, when beginning the application process for these resources, CESPT should turn to the appropriate Mexican agencies in search of the necessary matching funds. Historically, these types of funds have come from state government and the National Water Commission (CNA).

State and Federal Government

As previously mentioned, the participation of state and federal government should be sought for the combination of non-refundable resources that serve as matching funds for BEIF.

BANOBRAS (National Bank of Public Works and Services) has various programs for funding the construction of public works projects in Mexico. The Environmental Infrastructure Fund (FINFRA) offers non-refundable resources for the construction of potable water and sanitation projects that have participation from the private sector. This participation can be in various forms: contracts for the provision of partial services, the provision of integrated services, concessions, or co-investment. Each one of these options has advantages and disadvantages that should be analyzed in detail for each specific project.

The amount of non-refundable resources from the bank depends upon the efficiency of the operating agency and the type of private participation. CESPT could most benefit from a contribution of up to 30 percent.

United States Public Law 106-457

As was previously mentioned, U.S. Public Law 106-457 presents the potential for Tijuana of receiving grant funds from the United States government for the construction of a wastewater treatment plant in Tijuana to treat the wastewater generated in Mexico. Since the Public Law plant can be included within Alternative F-E, it is recommended that CESPT continue its communications with the appropriate agencies with the goal of analyzing the merits of this option in more detail.

Private Participation

As previously mentioned, the participation of the private sector in the construction and operation of some projects could be attractive for CESPT. It is recommended that different private participation plans be analyzed in greater detail. Private participation for some types of infrastructure, such as the desalination plant, would allow CESPT to satisfy demands without immediately paying the investment costs, in exchange for a series of periodic payments to the contractor.

Similarly, the participation of the private sector could facilitate the involvement of other financial institutions, such as BANOBRAS. There have been cases, such as the wastewater treatment plants in Ciudad Juarez, where private capital is combined with credit resources and non-refundable resources from the NADB, BANOBRAS and the Federal Government.

International Development Banks

For large-scale infrastructure projects, such as the projects recommended by the master plan, it would be advisable to seek the participation of international development banks, particularly the World Bank and the Interamerican Development Bank. The Japan Bank for International Cooperation is an example of the international bank participation.

Congressional Appropriations

On some occasions, Congress from both countries have assigned resources directly to specific projects with great wingspan during the development of their annual budgets. These projects will account for resources ensured for their implementation and must not compete for these funds with other promoters. It is recommended that CESPT initiate contact with representatives of Mexican Congress, as well as representatives of the city of San Diego, which may be interested in supporting, within the United States, the funding of potable water and wastewater infrastructure projects in Mexico that benefit their voters.